

Find The Sum Of $8a+2b-4$ And $3b-5$. Write. In Expanded Form And Then Standard Form

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When working with algebraic expressions, it is essential to understand how to combine like terms effectively. This skill helps simplify complex expressions and solve equations efficiently. In this article, we will explore how to find the sum of two algebraic expressions: $8a + 2b - 4$ and $3b - 5$. We will break down the process step-by-step, first writing the sum in expanded form, then simplifying it into standard form. Whether you're a student learning algebra or someone brushing up on basic algebraic operations, this comprehensive guide will help you master these concepts.

Understanding Algebraic Expressions

Before diving into the steps for adding the expressions, it's important to understand what algebraic expressions are.

What Are Algebraic Expressions?

- Algebraic expressions are mathematical phrases that contain variables (like a and b) and constants (numbers without variables).
- They can include addition, subtraction, multiplication, and division operations.
- Examples include $3a + 4b$, $5x - 7$, and $2y + 10$.

Terms and Like Terms

- Terms are the parts of an algebraic expression separated by addition or subtraction signs.
- Like terms are terms that have the same variables raised to the same powers. For example:
 - $8a$ and $3a$ are like terms.
 - $2b$ and $3b$ are like terms.
 - $8a$ and $2b$ are not like terms.

Step-by-Step Guide to Find the Sum

We are asked to find the sum of the two expressions:

- Expression 1: $8a + 2b - 4$
- Expression 2: $3b - 5$

Let's walk through the process systematically.

1. Write the Expressions in a Clear Format

Express the sum as:

```
\[
(8a + 2b - 4) + (3b - 5)
\]
```

2. Remove Parentheses and Combine Like Terms

Since the expressions are added, we can remove parentheses directly:

```
\[
8a + 2b - 4 + 3b - 5
\]
```

3. Group Like Terms

Group the terms based on their variables:

- Terms with 'a': $(8a)$
- Terms with 'b': $(2b + 3b)$
- Constants: $(-4 - 5)$

4. Simplify Each Group

- Combine the 'a' terms: $(8a)$ (no other 'a' terms to combine)
- Combine the 'b' terms: $(2b + 3b = 5b)$
- Combine the constants: $(-4 - 5 = -9)$

5. Write the Final Expanded Expression

The sum in expanded form is:

```
\[
8a + 5b - 9
\]
```

Converting to Standard Form

The standard form of a simplified algebraic expression arranges the terms in a specific order, usually with the highest degree (or variable) first.

What Is Standard Form?

- For linear expressions involving variables like a and b, the standard form typically orders the terms alphabetically: variable terms first, then constants.
- The standard form of the expression is:

$$\boxed{8a + 5b - 9}$$

Steps to Write in Standard Form

- Ensure like terms are combined, which we have already done.
- Arrange the terms in alphabetical order of the variables, i.e., 'a' before 'b'.
- Constants come at the end.

Therefore, the expression:

$$8a + 5b - 9$$

is already in standard form.

Summary of the Process

Step	Description	Result
Write the expressions	Write the sum with parentheses	$((8a + 2b - 4) + (3b - 5))$
Remove parentheses	Simplify the expression	$(8a + 2b - 4 + 3b - 5)$
Group like terms	Collect similar variables	$(8a + (2b + 3b) + (-4 - 5))$
Simplify groups	Add coefficients and constants	$(8a + 5b - 9)$
Write in standard form	Arrange terms alphabetically	$\boxed{8a + 5b - 9}$

Additional Tips for Algebraic Addition

- Always identify and combine like terms – terms with the same variables raised to the same power.
- Pay attention to signs (+ or -) to avoid errors during addition.
- Constants are numbers without variables; combine them separately.
- When adding multiple expressions, write each clearly and proceed systematically.

Practical Applications of Combining Algebraic Expressions

Understanding how to add algebraic expressions is fundamental in various fields, including:

- Algebraic problem-solving: Simplifying expressions before solving equations.
- Calculus: Combining functions for derivatives or integrals.
- Physics: Summing forces or quantities expressed algebraically.
- Economics: Calculating total costs or revenues expressed in algebra.

Practice Problems for Mastery

Try solving these to reinforce your understanding:

1. Find the sum of $(5x + 3y - 2)$ and $(4x - y + 7)$. Write in expanded and standard form.
2. Combine the expressions $(2m + 4n - 6)$ and $(-m + 3n + 8)$. Simplify completely.
3. Given $(a^2 + 2ab - 3b^2)$ and $(-a^2 + 4ab + b^2)$, find their sum in standard form.

Conclusion

Adding algebraic expressions involves a clear understanding of like terms, careful grouping, and proper arrangement. As demonstrated with the expressions $(8a + 2b - 4)$ and $(3b - 5)$, the process begins by expanding and grouping similar terms, then simplifying to arrive at the standard form: $(8a + 5b - 9)$. Mastering these skills enhances your ability to handle more complex algebraic problems and builds a solid foundation for advanced mathematics.

Remember, practice is key. Regularly working through similar problems will help you become confident in manipulating algebraic expressions efficiently and accurately.

Frequently Asked Questions

What is the expanded form of the expression $(8a + 2b - 4) + (3b - 5)$?

The expanded form is $8a + 2b - 4 + 3b - 5$.

How do you combine like terms in the expression $8a + 2b - 4 + 3b - 5$?

Combine the b terms ($2b + 3b$) to get $5b$, and the constants ($-4 - 5$) to get -9 , resulting in $8a + 5b - 9$.

What is the standard form of the sum of $8a + 2b - 4$ and $3b - 5$?

The standard form is $8a + 5b - 9$.

If $a = 2$ and $b = 3$, what is the value of the sum $(8a + 2b - 4) + (3b - 5)$?

Substitute $a = 2$ and $b = 3$: $8(2) + 2(3) - 4 + 3(3) - 5 = 16 + 6 - 4 + 9 - 5 = 22$.

Why is it important to combine like terms when simplifying algebraic expressions?

Combining like terms simplifies the expression, making it easier to evaluate or solve equations accurately.

Can the sum of the expressions be written in a polynomial form? If yes, how?

Yes, it is written as a polynomial in standard form: $8a + 5b - 9$.

Additional Resources

Find The Sum Of $8a+2b-4$ And $3b-5$. Write. In Expanded Form And Then Standard Form

Understanding how to manipulate algebraic expressions is a fundamental skill in mathematics, especially in solving equations and simplifying complex expressions. The process involves combining like terms, rewriting expressions in different forms, and understanding the structure of algebraic statements. Today, we will explore how to find the sum of two algebraic expressions: $8a + 2b - 4$ and $3b - 5$. We will walk through this process step-by-step, first writing the sum in expanded form, then simplifying it into its standard form. This exercise not only enhances algebraic proficiency but also provides insight into how expressions are structured and manipulated.

Understanding the Problem

Before diving into calculations, it is crucial to understand the problem's components:

- The two algebraic expressions:
 1. $8a + 2b - 4$
 2. $3b - 5$
- The goal:
 - Find their sum.
 - Write the resulting expression in expanded form.
 - Simplify the expression into standard form.

What are expanded and standard forms?

- Expanded Form: The expression as it naturally appears when written out, with all terms displayed explicitly.
- Standard Form: Usually, an algebraic expression is written with terms ordered from highest to lowest degree of the variable, and like terms combined.

In this context, the process involves combining like terms and arranging the expression in a clear, simplified manner.

Step 1: Write the Expressions in a Common Framework

When adding algebraic expressions, it's essential to align similar terms. The expressions involve variables a and b , as well as constants.

- First expression: $8a + 2b - 4$
- Second expression: $3b - 5$

Notice that:

- Both expressions contain the variable b .
- The first has the variable a , which has no counterpart in the second, so it remains unchanged.
- Constants are -4 and -5 .

Step 2: Write the Sum in Expanded Form

Adding the two expressions directly, we combine like terms:

$$(8a + 2b - 4) + (3b - 5) = ?$$

Expanding, this becomes:

- $8a$ (from the first expression)
- $+ 2b$ (from the first expression)
- $- 4$ (constant from the first expression)
- $+ 3b$ (from the second expression)
- $- 5$ (constant from the second expression)

Putting these together explicitly:

$$8a + 2b - 4 + 3b - 5$$

This is the expanded form of the sum: it lists all the terms explicitly, without combining like terms yet.

Step 3: Combine Like Terms

The next step involves grouping similar terms:

- Terms with 'a': $8a$
- Terms with 'b': $2b + 3b$
- Constants: $-4 - 5$

Calculating each:

- The a-term remains $8a$.
- The b-terms: $2b + 3b = 5b$
- The constants: $-4 - 5 = -9$

Now, the sum can be rewritten as:

$$8a + 5b - 9$$

This is the simplified, or standard form, of the combined expression.

Step 4: Understanding the Final Expression

The resulting algebraic expression $8a + 5b - 9$ provides a concise way to represent the sum of the original two expressions. Here, each term is ordered according to the variables' degrees:

- The term with a (degree 1 in a): $8a$
- The term with b (degree 1 in b): $5b$
- The constant term (degree 0): -9

This standard form clarifies the structure and makes it easier to perform further algebraic operations, such as substitution or solving equations.

Additional Considerations and Applications

Understanding how to combine algebraic expressions in both expanded and standard forms is crucial across various fields:

- In Algebra: Simplifies expressions, solves equations, and prepares expressions for graphing.
- In Calculus: Helps in differentiating or integrating complex expressions.

- In Physics: Facilitates the combination of formulas involving multiple variables.
- In Economics: Assists in modeling cost, revenue, or profit functions.

Practical tips:

- Always look for like terms when combining expressions.
- Keep track of signs (+/-) carefully to avoid errors.
- When in doubt, write expressions in expanded form before combining to ensure no term is overlooked.
- Remember that the order of terms in the standard form typically starts with the highest degree variable.

Summary

In conclusion, the process of adding algebraic expressions involves a systematic approach:

1. Write the expressions in expanded form, explicitly listing all terms.
2. Group like terms based on variables and constants.
3. Perform arithmetic on these like terms.
4. Reconstruct the simplified expression in standard form, with terms ordered appropriately.

Applying these steps to find the sum of $8a + 2b - 4$ and $3b - 5$ results in the simplified expression:

$$8a + 5b - 9$$

This exercise underscores the importance of algebraic manipulation skills that form the foundation for more advanced mathematical and scientific endeavors. Whether solving equations, modeling real-world problems, or performing calculus, mastering how to combine and simplify expressions is a vital skill for students and professionals alike.

Final note: Practice with various expressions involving multiple variables and constants to build confidence. The more familiar you are with these fundamental operations, the smoother your mathematical journey will become.

[Find The Sum Of \$8a + 2b - 4\$ And \$3b - 5\$ Write In Expanded Form](#)

And Then Standard Form

Find The Sum Of $8a^2b^4$ And $3b^5$ Write In Expanded Form And Then Standard Form

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